

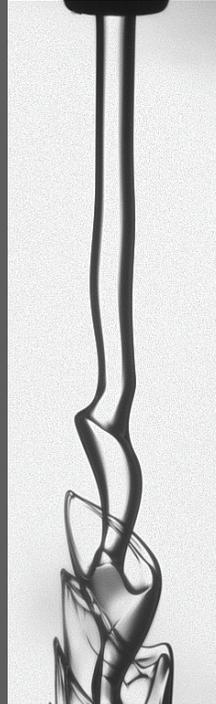
Rheology Bulletin



150 μm



Newtonian



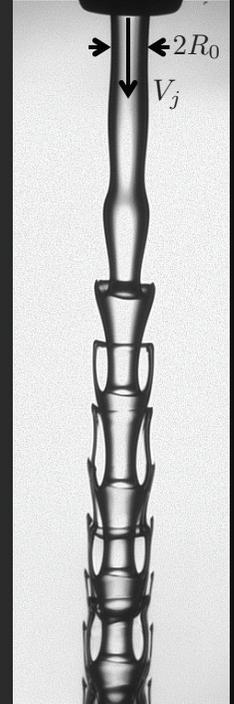
$kR_0 = 0.52$

Newtonian



$kR_0 = 0.66$

Newtonian



$kR_0 = 0.80$

Newtonian



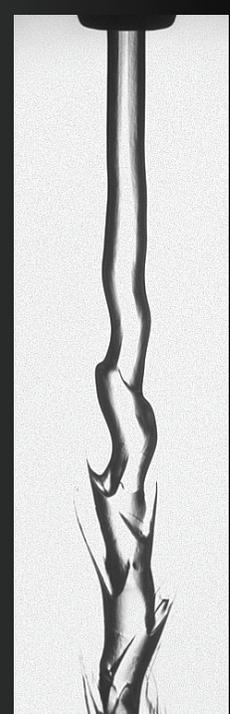
$El = 0.00$

Viscoelastic 1



$El = 0.08$

Viscoelastic 2



$El = 0.10$

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On the Cover: *Chevron-like Waves of a Submerged Viscoelastic Jet*, the winning poster of the inaugural Gallery of Rheology Contest, is the work of Bavand Keshavarz, Michela Geri, and Gareth H. McKinley from the Massachusetts Institute of Technology. For the complete poster of the cover image and the second place finisher as well, see page 6.



Community and conversation are the byproducts of SOR meetings; just ask Jeffrey Martin, Gordon Christopher, Anthony Kotula, Craig Snoeyink, Debjani Roy, and Kelly Schultz.

The *Rheology Bulletin* is the news and information publication of The Society of Rheology (SOR) and is published twice yearly in January and July. Subscription is free on membership in The Society of Rheology. Letters to the editor may be sent to: fmorriso@mtu.edu

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Gerald G. Fuller
Gerald G. Fuller

Susan J. Muller
Gerald G. Fuller

Shelley Anna



SOR Denver 2017 is a wrap. The meeting went very well thanks to the hard work of the Local Arrangements Committee, led for Denver by Chair Matt Liberatore, assisted by Andy Kraynik, Joseph Samaniuk, Nathan Crawford, and Johnathan Stickel. SOR still runs its meetings with volunteer leadership and elbow grease, a rarity these days for professional societies. And the volunteers are cheerful, exceptionally hard-working, and dedicated. We send our thanks to the Denver team, to all past Local Arrangements teams, and to those who will provide this service in the future.

The Denver meeting was held in the Embassy Suites Denver Downtown, located on Stout Street, just off the 16th Street Mall, a pedestrian-friendly shopping and gawking district. The venue was walking distance to the Colorado State Capitol and to numerous other local attractions. Rheologists were treated to a little October snow, although not so much that it caused any difficulties.

The meeting events that preceded the technical sessions included the short course, a student/industry forum, and a K-12 outreach event. The short course, *Extensional Rheology: Theory and Experimental Practice*, was presented by Nicolas Alvarez (Drexel University), Cari Dutcher (University of Minnesota), and Martin Sentmanat (Xpansion Instruments). The short course had 19 registrants: 13 from industry, 4 from academia and 2 from government labs. The *Careers in Rheology* forum was chaired by Aslin Izmitli (Dow Chemical), Catherine O'Riordan, (AIP),

The Blue Bear looks like the snow is causing her some distress! Too bad she can't get into the Convention Center. This sculpture, by Laurence Argent, has been on the scene at the Convention Center since 2005.



and Maryam Sepehr (Chevron Oronite), and the moderator was Gerry Fuller (Stanford). Speakers included Tirtha Chatterjee (Dow Chemical), Necla Eren (Abbott Laboratories), Jeffrey Martin (Johnson & Johnson), Nicholas Wyatt (Sandia National Laboratories), and Roseanna Zia (Stanford). This event was generously sponsored by Dow Chemical Company and the American Institute of Physics.

The *K-12 Outreach Event* was also held on Sunday, hosted by the Denver Children's Museum. Jonathan Rothstein and his Education Committee colleagues and student/postdoc volunteers greeted approximately 250 children and families and shared with them some of the





Celebrating with 2017 Bingham medalist Julia Kornfield are members of her academic tree, Gerry Fuller, Andy Acrivos and Gary Leal (left photo); at right is Kornfield with her spouse, Julia Lester.



unusual, puzzling, and delightful effects caused by non-Newtonian fluids. Under Rothstein, the K-12 effort has been part of SOR meetings for several years and we now have a website listing ten outreach demos with instruction guides. See the SOR website for more information (www.rheology.org).

So much to say in this report, and the meeting has not even started! The official start of the meeting was the welcoming reception sponsored by The Society of Rheology, held in the conference hotel. There were 405 meeting registrants and 14 exhibitor registrations. All registrants were gifted water bottles sponsored by Malvern. There were 364 technical contributions: 261 oral presentations, 85 posters, and 18 submissions for the *Gallery of Rheology* competition (see below).

The technical program got started Monday morning. Organized by Anne Grillet (Sandia National Laboratories) and Randy Ewoldt (University of Illinois at Urbana-Champaign), the professional events included the usual parallel sessions and something new this year, the *Gallery of Rheology (GOR) Contest*. The Technical Program team solicited posters or prints with images of deformation, flow, material structure, and other work that emphasizes visually engaging aspects of rheology. A contest was held, including a popular vote for first and second place, with the added induce-

(continues page 17)



The calm moments before the start of the plenary are shared among (clockwise from left) Chris Macosko, meeting organizer Matt Liberatore, speaker Michel Cloitre, David Moonay, and Bob McGregor. At right, Metzner recipient Aditya Khair receives his plaque from SOR President Gareth McKinley.

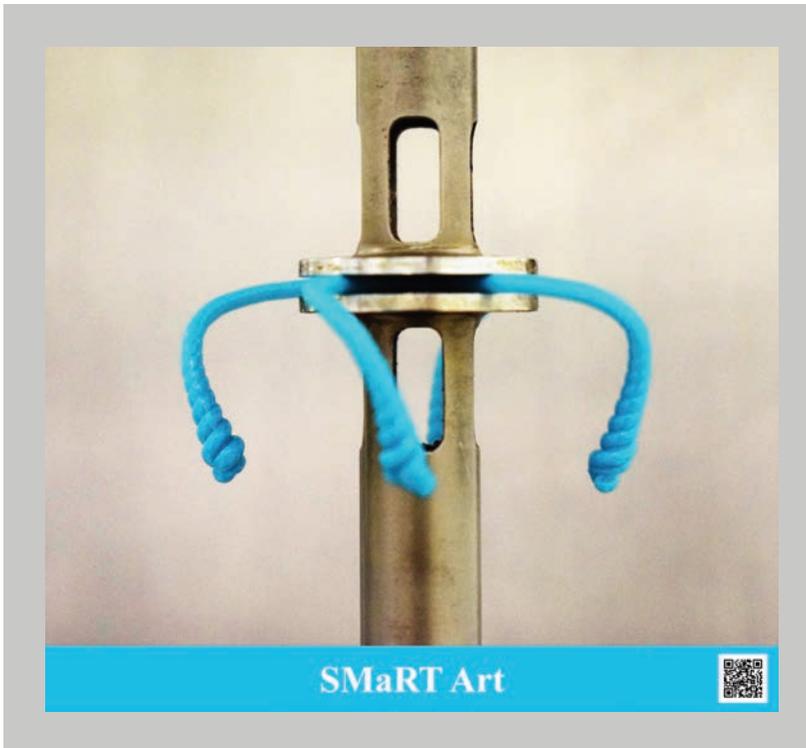


Chevron-like waves of a submerged viscoelastic jet

Bavand Keshavarz, Michela Geri, and Gareth H. McKinley, Massachusetts Institute of Technology

A novel experimental setup, equipped with strobe imaging, is used to study the instability patterns of a submerged liquid jet. Visualizations for the Newtonian liquids show that the jet is unstable to linear perturbations. At low wave-numbers, unstable varicose waves pile up into a continuously growing sinuous mode due to the difference in the corresponding wave speeds. This leads to some unique concertina or chevron-like patterns. Using the strobe technique, we can record the evolution of these complex axisymmetric waves at high spatial and temporal resolutions. For viscoelastic jets, the growth of the inertial waves is substantially inhibited by the streamline tension due to the added elasticity (First Place).

GALLERY OF RHEOLOGY STANDOUTS

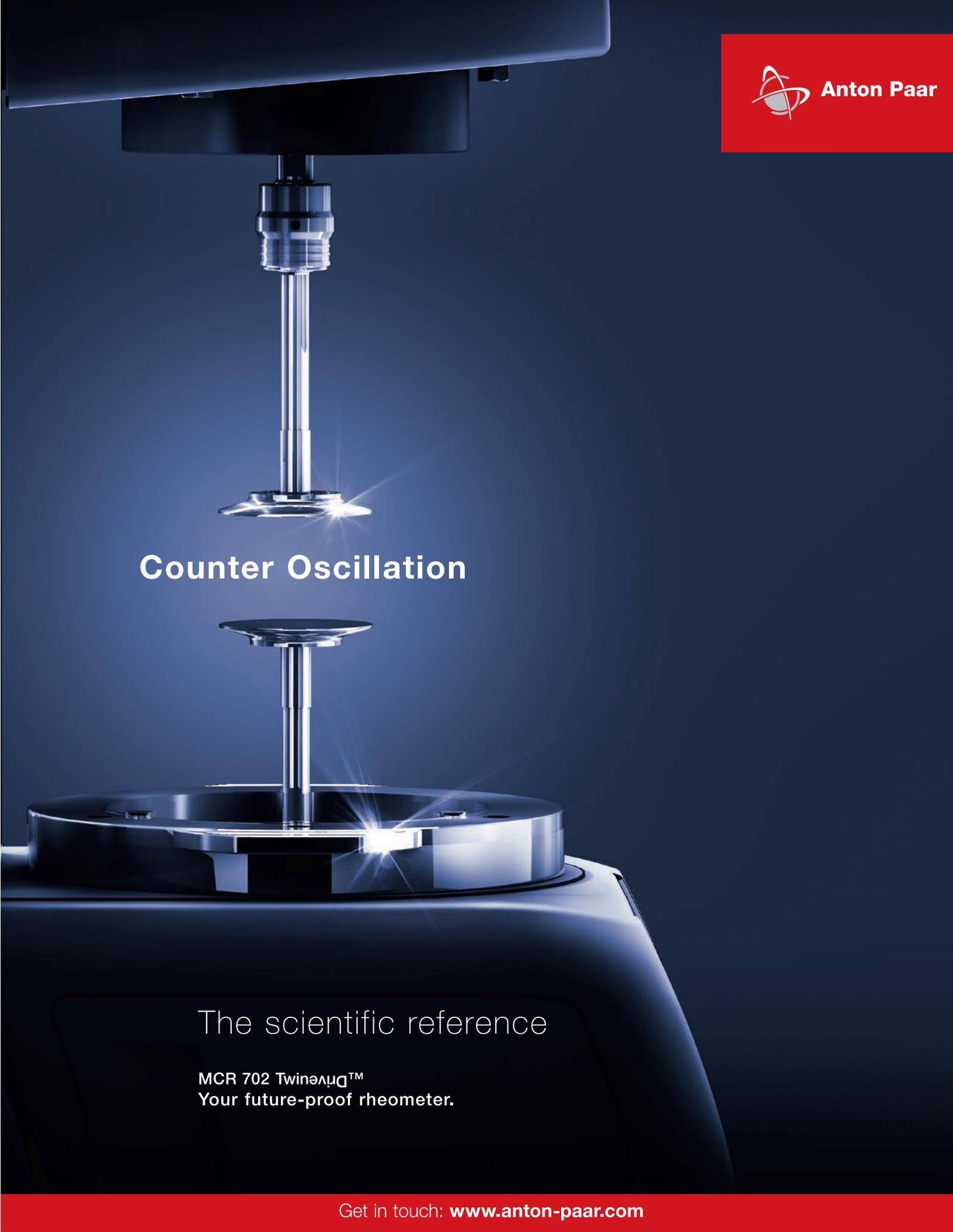


Silly Putty® Tetrapus

Anja Vananroye, Peter Van Puyvelde, and Christian Clasen, KU Leuven (Katholieke Universiteit Leuven)

When Silly Putty® is forced to undergo a shearing deformation in a plate-plate geometry, it develops a peculiar instability that leads to a sample loss in form of four curled 'arms' that stretch out and rotate around the geometry, forming the silly putty tetrapus (Second Place).





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Letter from the New SOR President

Dear Colleagues and Society Members,

As your new President I am pleased to report that the state of our Society is strong! Join us this year as we celebrate the 90th Society of Rheology meeting in Houston with a program that reflects the excellence and remarkable breadth of our Society (the technical sessions and plenary speakers can be found in this *Bulletin*). Our prior Executive Committees have implemented wise and prudent financial decisions and management initiatives, such that we are blessed with a vibrant volunteerism, financial stability, a world-leading journal, truly exceptional national meetings (that attract a broad and diverse, international audience), and a growing rheology outreach program that educates K-12 students as well as professionals world-wide. I wish to take this opportunity to thank the outgoing President, Gareth McKinley, Past-President, Greg McKenna, and outgoing Members-at-Large, Patrick Anderson, Maryam Sepehr, and Mike Solomon for their thoughtful and dedicated service. Luckily, our founders wisely mandated keeping the immediate past president as an active, voting member of the Executive Committee, and I am very grateful to have outgoing President Gareth McKinley continue to serve and lead our society, especially in his new service role as ‘Society Historian.’ Indeed, the Society was founded in 1929, such that we have a rich scientific and engineering, as well as human, heritage to document and celebrate. Gareth’s write-up in this *Bulletin* explains the Society’s history program and how you can be involved.

Please join me in welcoming our newly elected Executive Committee members, Vice-President Mike Graham and Members-at-Large Michel Cloitre, Eric Furst, and Amy Shen, who join our capable Treasurer Chris White, Secretary Albert Co, *Journal* Editor Ralph Colby, and Past-President Gareth McKinley. Our contact information can be found on the SOR website and please feel free to reach out to any of us with questions, concerns, initiative ideas and interest in serving the Society.

Our constitution provides guidance as to our Society’s objective, namely, to advance “rheology and its applications.” In 2017, the SOR Executive Committee held a



retreat to codify a formal statement of vision, values, and mission, the text of which immediately follows this letter. Rheology is an important discipline that impacts science and engineering broadly, such that its practitioners in industry, academia and national laboratories and institutes are actively addressing many of the grand challenges facing humanity. Rheologists can and do make a difference in this world, and our mission is to promote your efforts.

To better accomplish this mission, we convened an ad hoc financial advisement committee to work with our capable treasurer and the Executive Committee to steward our financial resources, so as to provide that which is necessary to achieve our goals. An independent audit committee reviews society finances. These committees, essential to the legal and ethical operation of a modern scientific society, will be brought to the membership to become formal and permanent within our Rules. Our membership committee will seek to increase industrial membership and diversity more broadly. The success and increasing activities of our education committee necessitates having co-chairs

who can dedicate effort to our phenomenal K-12 outreach program, as well as new initiatives bringing rheology education via short courses around the country so as to reach even more students and industrial professionals.

Our meetings policy committee continues to deliver exceptional national meetings, such that following on the invigorating Denver meeting (a special thanks again to ‘local’ organizers Matt Liberatore and Andy Kraynik and technical program co-chairs Anne Grillet and Randy Ewoldt), we will travel to Houston, Texas (2018), then Raleigh, North Carolina (2019) and, following the 2020 ICR

in Rio de Janeiro, Austin, Texas for our winter, 2021 meeting. Indeed, planning is well underway for the fall 2021 meeting in Bangor, Maine, and sites are being solicited for 2022 and beyond (proposals are welcome!). An exciting and diverse technical program for Houston created by technical co-chairs Marie-Claude Heuzey and Gordon Christopher will be matched with an outstanding venue and social program from the local organizers, led by Jason Maxey. Innovations include industrial keynote



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speakers for each technical session, and we welcome the return of the *Gallery of Rheology* contest. Member-at-large Eric Furst will be administering the popular and valued student member travel grants – thank you to all who have already donated to support this program! New donations (accessible via the membership renewal site) are always appreciated.

We are a volunteer society and are always seeking new participants and new initiatives that promote rheology. There are many volunteers (many listed on the masthead) who serve you and the Society as representatives on various American Institute of Physics (AIP) committees of importance to our society, as well as representatives on international and national committees. Gerry Fuller continues his outreach to help foster and grow rheology societies, as well as teach rheology, around the world. The success of our robust and innovative K-12 educational outreach program at the national meetings, led by Jonathan Rothstein (I encourage you to check out the experiments on his web site , and these experimental kits available for your own, local outreach programs), and our successful *Careers in Industry* panel, cosponsored by AIP/Dow are examples of the value you can bring to the Society by giving of your time and expertise. A new initiative will partner with AIP to leverage Society efforts to increase the diversity of our membership and the reach of our society. This includes increasing the membership of women and underrepresented minorities, so as to be more in concert with society more broadly, as well as rheologists from industry, national laboratories and institutes, and further, international members and students from a broader range of disciplines. Maryam Sepehr, our representative on the AIP committee especially concerned with diversity, will be leading a new ad hoc committee to develop a formal proposal this summer to AIP for resources and partnership. Please contact me and/or Maryam with ideas and volunteerism.

Just a brief reminder that nominations are currently being solicited for the Bingham Medal, the Arthur B. Metzner Early Career Award, as well as nominations for SOR Fellows. I encourage you to (continue to) publish your best rheology research in the *Journal*, internationally recognized as the leading journal in the field. Editor Ralph Colby is joined by associate editor Roseanna Zia and editorial assistant Ania Bukowski as they continue to reduce time-to-publication and increase technical quality and journal reputation as evinced by rising journal rankings. Indeed, the Society seeks to be a home for the highest quality rheology research – this is recognized in part by the prestigious *Journal of Rheology* Publication award, which is presented annually at the national meeting, along with awards for best posters by both students and postdoctoral fellows.

Finally, I wish to close by thanking Faith Morrison, the editor (and publisher!) of our truly unique, informative, and often entertaining, *Rheology Bulletin*, who also serves on the AIP Board of Directors. Please forward any suggestions or ideas you have that are of interest to the Society and suitable for the *Bulletin*.

It is my privilege to serve you as your president for the next two years. Please feel free to contact me with your suggestions, concerns, and volunteerism. Best wishes for 2018!

Norm Wagner, President, SOR, wagnernj@udel.edu

Rheology Oral History Update

by Gareth McKinley

As Norm notes in his President's Letter, I have recently taken over from Jeff Giacomini as the SOR Representative to the AIP History Liaison Committee, which is chaired by Greg Good, Director of the Center for History of Physics in the Niels Bohr Library & Archive (NBLA) of AIP. In the last *Rheology Bulletin* [v. 86(2), p21] our NBLA librarian, Paula Moore, described some of the SOR materials that are present in the Archives (including an original hand-annotated version of our Constitution), and a new "History Portal" (history.aip.org/society-portals/sor/sor.html) designed to improve ready access to our archives. Of particularly unique



interest are some audiotape recordings (e.g. with Herman Mark and George Scott-Blair amongst others) that formed part of a nascent Oral History project that was initiated as part of the Society's 50th Anniversary in 1979. This project seems to have stalled and was never completed, but with our 100th Anniversary on the (approaching) horizon, a number of us are interested in resurrecting and expanding this important archival project to capture reminiscences from many of those who helped develop and grow the Society and our scientific discipline in its early days. Jeff Giacomini recently completed the first informal interview and discussion with 94 year old Prof R. Byron Bird, and this transcript will soon be available through NBLA. Jointly, Jeff and I have also identified a number of other founders of our discipline that we are eager to record also. To aid us in this project, Greg Good has kindly offered to run a short (two hour) session on the art of conducting a good Oral History, and we hope to offer this during the Houston Annual Meeting this coming October. If you are interested in participating in this workshop, or have suggestions for us, please do not hesitate to email me (gareth@mit.edu).

The Society of Rheology

Our Vision

An international community of rheologists working towards common goals as articulated in our founding Constitution.

Values

We are the nexus of excellence in the theory and practice of rheology. We are committed to advancement and promotion of the rheological sciences and practice of rheology broadly across diverse groups of individuals, disciplines and industries.

Mission

We aim to expand the knowledge and practice of rheology through education, partnership and collaboration with associated fields, industries, and organizations, as well as to disseminate to diverse communities what rheology is, and how it impacts humanity and the world.

Adopted by the SOR Executive Committee, 10 June 2017



And the Ig[®] Nobel Prize goes to...

The 2017 Ig[®] Nobel Prizes were awarded on 14 September 2017 at the 27th First Annual Ig[®] Nobel Prize Ceremony, at Harvard's Sanders Theatre. In 2017 the Physics Ig Nobel Prize was awarded to rheologist and SOR member Marc-Antoine Fardin, for using fluid dynamics to probe the question "Can a Cat Be Both a Solid and a Liquid?"



and a Liquid?" Readers of the *Bulletin* will recognize this "research" from the summer *Bulletin* three years ago: "On the Rheology of Cats," Marc-Antoine Fardin, *Rheology Bulletin*, vol. 83, 2, July 2014, pp. 16-17 and 30.

According to those who award them, the Ig[®] Nobel Prizes (www.improbable.com) "honor achievements that first make people laugh, and then make them think. The prizes are intended to celebrate the unusual, honor the imaginative — and spur people's interest in science, medicine, and technology." The 27th First Annual Ig[®] Nobel Prize Ceremony may be watched in its entirety on Improbable Research's YouTube channel (<https://youtu.be/yNwLjRpNHhI>). Fardin accepts his Ig Nobel Prize beginning at minute 14:00. The honor was noted in *The Guardian* (14 September 2017) and now, once again, in the *Rheology Bulletin*. Congratulations!

On the rheology of cats

M.A. Fardin^{1,2,3,*}

¹Université de Lyon, Laboratoire de Physique, École Normale Supérieure de Lyon, CNRS UMR 5672, 46 Allée d'Italie, 69364 Lyon cedex 07, France.

²The Academy of Brudologists.

³Member of the Extended McKinley Family (EMF).

(Dated: July 9, 2014)

In this letter I highlight some of the recent developments around the rheology of *Felis catus*, with potential applications for other species of the felidae family. In the linear rheology regime many factors can enter the determination of the characteristic time of cats: from surface effects to yield stress. In the nonlinear rheology regime flow instabilities can emerge. Nonetheless, the flow rate, which is the usual dimensional control parameter, can be hard to compute because cats are active rheological materials.

παντα ρει! Everything flows! This famous aphorism used to characterize Heraclitus' thought is also the motto of *rheology*. "Everything flows and nothing abides; everything gives way and nothing stays fixed." a recipe for insubordination actually from Simplicius and Plato. Everything flows? Well, it depends on the definition of a *flow*: if sufficiently general, there is no doubt that there are no exceptions to the rule! What is a flow? What is a fluid? As pointed out from the start by Reiner, the essential value of rheology is to recognize that states of matter are a matter of time(s). The first time, is a *time of observation T*. What is true today may not be true tomorrow. Time over time, one day 49, the next 50.

Historically, the popular distinction between states of matter has been made based on qualitative differences in bulk properties. Solid is the state in which matter maintains a fixed volume and shape; liquid is the state in which matter maintains a fixed volume but adapts to the shape of its container; and gas is the state in which matter expands to occupy whatever volume is available. Following these common sense definitions, a meta-study entitled "Cats are liquids" was recently published on boredpanda.com. I propose here to check if the panda's claim that the cats are liquid is solid, by using the tools of modern rheology.

First of all, 'maintains', 'adapts' or 'expands' are verbs. They describe actions unfolding with a characteristic

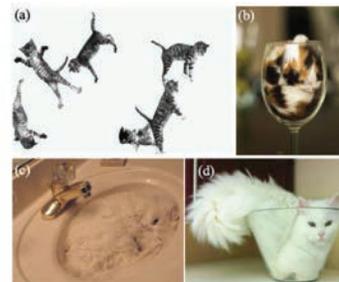
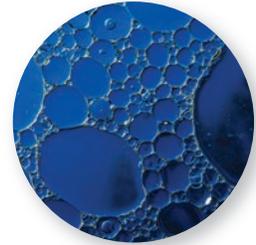


FIG. 1: (a) A cat appears as a solid material with a consistent shape rotating and bouncing, like Silly Putty on short time scales. We have $De \gg 1$ because the time of observation is under a second. (b) At longer time scales, a cat flows and fills an empty wine glass. In this case we have $De \ll 1$. In both cases, even if the samples are different, we can estimate the relaxation time to be in the range $\tau = 1$ s to 1 min. (c-d) For older cats, we can also introduce a characteristic time of expansion and distinguish between liquid (c) and gaseous (d) feline states. [(a) Courtesy of <http://cat-bounce.com>. (b) <http://www.dwelbist.com/2009/07/kitten>

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Technical Program for Houston

Organizers:

Marie-Claude Heuzey

Department of Chemical Engineering
Polytechnique Montréal
Quebec, Canada

Gordon Christopher

Texas Tech University
Department of Mechanical Engineering
Lubbock, TX USA

Plenary Speakers:

Lynn Walker, Carnegie Mellon University

Research interests: Complex fluids rheology, understanding and controlling complex, or structured, fluids in engineering applications.

Wilson Poon, University of Edinburgh

Research interests: Physics of living matter, soft matter physics

Sessions chairs:

Sessions

- 1) *Foams, Emulsions & Interfacial Rheology*
John Frostad (University of British Columbia),
Joseph Samaniuk (Colorado School of Mines)
- 2) *Polymer Melts and Processing*
Reza Foudazi (New Mexico State University),
Richard Graham (The University of Nottingham)
- 3) *Suspensions & Colloids*
Giovannantonio Natale (University of Calgary),
Roseanna N. Zia (Stanford University)
- 4) *Polymers in Solution*
Nicolas J. Alvarez (Drexel University),
Cari Dutcher (University of Minnesota)
- 5) *Polyelectrolytes, Self-assembling Systems & Gels*
Nick Virgilio (Polytechnique Montreal),
Lilian Hsiao (North Carolina State University)
- 6) *Non-Newtonian Fluid Mechanics & Flow Instabilities*
Aditya Khair (Carnegie Mellon University),
Christian Clasen (KU Leuven)
- 7) *Advanced Experimental Techniques/Methods in Rheology*
Kalman Migler (NIST),
Simon Rogers (University of Illinois at Urbana-Champaign)
- 8) *Solids, Composites & Granular Materials*
Jonathan Seppala (NIST),
Denis Rodrigue (Université Laval)
- 9) *Biological and Active Matters*
Pushkar Lele (Texas A&M University),
Kelly Schultz (Lehigh University)
- 10) *Design of Applied Materials*
Jeffrey Martin (Johnson & Johnson),
Matthew J. Armstrong (USMA West Point)
- 11) *Additive Manufacturing*
Anthony Kotula (NIST),
Patrick Anderson (Eindhoven University of Technology)
- 12) *Flow Assurance of Crude Oil & Derivatives*
Monica F. Naccache (PUC Rio),
Rama Venkatesan (Chevron)
- 13) *Food, Pharmaceuticals & Cosmetics*
Siva A. Vanapalli (Texas Tech University),
Michael Boehm (PepsiCo)
- 14) *Gallery of Rheology Contest*
Randy Ewoldt (University of Illinois at Urbana-Champaign)
- 14) *Posters*
Vivek Narsimhan (Purdue University),
Rajesh Khare (Texas Tech University)



New Feature Alert

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First Issue with Journal of Rheology Review Article

The Journal of Rheology begins 2018 with its first Review Article: “Single Polymer Dynamics for Molecular Rheology”, contributed by Charles M. Schroeder from *The University of Illinois*.

The images on the cover are taken from the Journal of Rheology's first invited review, Single Polymer Dynamics for Molecular Rheology by Charles M. Schroeder.

The top two-color image shows polymer backbones (green) and branches (red) for single-tethered comb polymers stretching in a shear flow. The middle band of images shows DNA polymers relaxing after a strong elongational flow (a DNA ring polymer on the left and a DNA linear polymer on the right). The bottom images show single-molecule stretching trajectories of a linear polymer in large amplitude oscillatory extensional flow, with the corresponding single molecule Lissajous curve on the right, showing the average polymer fractional extension vs. Weissenberg number that are parts of Figure 6, reproduced with permission of the American Chemical Society.



Upcoming topical reviews may include:

- Flow-induced crystallization of polymers
- Flow behavior of dense suspensions
- Flow-induced phase transitions
- Soft glassy rheology

The Brazilian Society of Rheology

invites you to participate in the XVIIIth International Congress on Rheology, which will take place in Rio de Janeiro, Brazil from 2-7 August 2020. The Congress convenes every four years and brings together the world's leading rheologists to present the latest advances and developments in this field.

The Congress will include opening and closing plenary lectures and keynote lectures by eminent rheologists, contributed oral presentations organized into seventeen symposia, and a poster session. Two short courses will be offered on the weekend before the Congress.

In addition to the technical program, an active social program is planned, which will introduce the participants to the wonderful attractions of Rio de Janeiro. The Congress is being organized by Paulo de Souza Mendes, Mônica F. Naccache, Verônica Calado, and Roney Thompson. For more information, please visit our website, icr2020.com.

*Monica Naccache
Paulo R. de Souza Mendes*



ICR 2020 Brazil



Museu do Amanhã - Cidade do Rio de Janeiro - Foto Alexandre Macieira Riotur

Copacabana e o Cantagalo - Cidade do Rio de Janeiro - Foto Alexandre Macieira Riotur



Cristo e o Pão de Açúcar - Cidade do Rio de Janeiro - Foto Alexandre Macieira Riotur

(Denver Report, continued from page 5)

ment of the first-place image being featured on the cover of the *Rheology Bulletin*. The GOR images were up for preview beginning Tuesday of the meeting, with the final awards being presented during the poster session (see page 21 for GOR awardees).

On Monday evening, TA Instruments hosted a gala reception at the Colorado History Museum. SOR meeting attendees had the run of the place, great food, and plenty of opportunities to try out the hands-on (and in some cases full-body; see page 21) displays on offer.

The annual business meeting of The Society of Rheology took place on Tuesday afternoon with 105 in attendance. The Bingham Award Reception and Banquet was the same day. The awards reception and banquet was a fitting fête of Julie Kornfield (CalTech), the 2017 Bingham medalist. The traditional roasting was handled by Wes Burghardt (Northwestern University). Kornfield is the first woman to receive the Bingham award in the 88-year history of the Society. Also at the banquet, the Early Career Metzner award was presented to Aditya Khair of Carnegie Mellon, and the Publication Award was presented to Suzanne Fielding and David Hoyle (University of Durham). Five of seven new SOR fellows were present to be inducted (see photo page 19); all SOR fellows are listed on the Society's website (www.rheology.org).

The poster session in Denver was extremely well attended and successful as measured by the overall buzz and quantity of refreshments consumed. Many thanks to event sponsor Anton Paar. The *Student/Post-Doc Poster Competition* was conducted by session chairs Jim Gilchrist (Lehigh University) and Scott Roberts (Sandia National Laboratories). Honorees and their contributions are described in the News section of this *Bulletin* (page 20).

The next SOR meeting is 14-18 October 2018 in Houston, Texas, hosted by Jason Maxey (Halliburton; photo below). Although the flooding of Hurricane Harvey in 2017 affected 30% of Houston, none of the SOR venues were affected, including the main hotel, the Westin Galleria. Pencil the dates into your calendar and join us for another celebration of the rheology community in Houston this fall.



Denver gathered six recipients of the Arthur B. Metzner Early Career Award: Patrick Underhill, Charles Schroeder, Aditya Khair, Randy Ewoldt and Suzanne Fielding. One recipient missed the picture but not the meeting, Jonathan Rothstein.



Johannes Soulages (Exxon) engages a future rheologist (left), while volunteer Syed Ehsanur Rahman (Texas Tech) shows the secrets of Silly Putty® to a crowd (below). The K-12 Outreach event in Denver was held at the Denver Children's Museum.



At left, our Houston host Jason Maxey enjoys a reception he did *not* have to plan, along with Simon Rogers, Cameron Hopkins, and Travis Walker.



NEWS

AIP Announces the Hiring of its New CEO: Michael Moloney

The American Institute of Physics (AIP) announced the hiring of a new CEO, experimental physicist Michael H. Moloney. Moloney assumes the role 5 March 2018, replacing interim co-CEO's Catherine O'Riorden and Catherine Swartz, the current COO and CFO, respectively. Swartz and O'Riorden, who remain at AIP in their COO and CFO roles, have led AIP since the retirement of Robert G.W. Brown in May 2017.

Moloney holds a doctorate in experimental physics from the University of Dublin, Trinity College in Ireland, and he becomes the ninth executive to lead AIP. His prior position was Director for Space and Aeronautics at the Space Studies Board and the Aeronautics and Space Engineering Board of the U.S. National Academies of Sciences, Engineering, and Medicine.

"I know I speak on behalf of the entire AIP board of directors when I say that we are delighted to welcome Dr. Moloney as our new CEO," said John Regazzi, chairman of the AIP board of directors. "His years at the National Academies and his policy and media experience distinguish him as a strategic leader who knows how to foster the translation of fundamental scientific knowledge into practical programs that create value in our community and benefit everyone."

The Aeronautics and Space Engineering and Space Studies Boards Moloney has led for the last eight years are among the largest units at the National Academies. Since joining the National Academies, Moloney has overseen the production of close to 100 reports, including five decadal surveys in astronomy and astrophysics, Earth science and applications from space, planetary science, microgravity sciences, and solar and space physics. He has also played a leading role

in the production of decadal surveys in several physics disciplines -- including atomic, molecular and optical physics, condensed matter physics, and plasma physics. Moloney worked for more than seven years as a foreign service officer for the Irish government, serving at both the Irish Embassy in Washington, D.C. and the Irish Mission to the United Nations in New York, as well as working as a press officer for the service in Dublin.

Moloney is looking forward to leading AIP. "Science is rapidly changing and becoming more interdisciplinary, and the fields of physical science connect like never before," Moloney said.

"I look forward to working with the AIP community to ensure we can continue to advance and promote the physical sciences for the benefit of all of us."

SOR designee to the AIP Governing Board Faith Morrison served on the CEO search committee. "It's a great pick," says Morrison. "Michael Moloney has a strong vision for the physical sciences and a great enthusiasm for the mission of AIP. We're lucky to have him. We also owe a debt of gratitude to Cathy O'Riorden and Gigi Swartz, who took on the interim co-CEO roles and kept a very steady hand on the tiller these last nine months."

ICR2020 Set for Brazil; Subsequent ICR Shifted Forward to 2023 in Europe

The website for ICR2020, the XVIIIth International Congress on Rheology, is up and running; plan for an enriching and enjoyable trip to Rio de Janeiro, Brazil 2-7 August 2020. Your South American colleagues Paulo de Souza Mendes and Roney Thompson look forward to hosting you.

The International Congresses on Rheology have been taking place every four years for many decades, but a change in timing has been approved that will bring the subsequent ICR to the rheological community in 2023. The shift has been made to prevent a conflict with the quadrennial meeting of the International Congress of Theoretical and Applied Mechanics (ICTAM), which until now has been on the same four-year cycle as

the international rheology meeting. By advancing the ICR schedule by a year, rheologists can more readily participate in both meetings. The formal proposal to make the change was made in 2017 by SOR president (at the time) Gareth McKinley and approved unanimously by the International Committee on Rheology, the coordinator of the ICR meetings. The 2023 meeting will be hosted by the European Society of Rheology (ESR).

2017 Fellows of The Society of Rheology Inducted

Five of the seven members of the SOR Fellows Class of 2017 gathered in Denver to receive their honors. Pictured are: Manfred H. Wagner (Technical University of Berlin), Lynn M. Walker (Carnegie



Mellon University), Jay D. Schieber (Illinois Institute of Technology), Hans Martin Laun (BASF, retired), and Wesley R. Burghardt (Northwestern University). Also members of the class are Tam Sridhar (Monash University) and Ken Walters (Aberystwyth University). There are now fifty SOR fellows; the program began in 2015. The SOR Fellowship status recognizes a history of distinguished scientific achievement, a significant technological accomplishment, and/or outstanding scholarship in the field of rheology. Service to the Society is also an important component to Fellowship status.

Nominations Solicited: SOR Fellows

Paula Moldenaers
Chair, SOR Fellowship Committee

Outstanding members of The Society of Rheology,

who have contributed to rheology through the science, technological accomplishments, peer-reviewed literature, and/or service can be nominated for Fellowship in The Society of Rheology. The Qualifications are given in details by Section 7 of ARTICLE VII of the SOR Rules. Only SOR members who have been members of good standing for at least 8 years are eligible for this member category.

The requirements of the nomination package and more details can be found at www.rheology.org/sor/fellowship/nom2018.htm.

The nominating documents should be combined into a single PDF file and uploaded at www.rheology.org/SoRFellowNom/, following the instructions found there. The single concatenated PDF file must not exceed 3 MB. The deadline for submission is 15 March 2018.

Nominations that are not successful in their first year will be automatically carried over for two additional years, after which they must be refreshed by a new submission.

We are especially keen to receive industrial rheologists into the ranks of the Fellows.

Nominations Solicited: Bingham, Metzner

Nominations are invited for the 2018 Bingham Award. Nomination materials should be combined electronically into a single concatenated PDF file and uploaded at www.rheology.org/SoRBinghamNom/, following the instructions found there. The single concatenated PDF file must not exceed 3 MB. The deadline for submission is 20 February 2018.

The 2018 Bingham Medalist will be selected by the Bingham Award Committee, currently chaired by David Venerus (venerus@iit.edu), and confirmed by the SOR Executive Committee.

Nominations are also invited for the 2018 Arthur B. Metzner Early Career Award. Nomination materials should be combined electronically into a single concatenated PDF file and uploaded at www.rheology.org/SoRMetznerNom/, following the instructions found there. The single concatenated PDF file must not exceed 3 MB. The deadline for submission is also 20 February 2018.

The 2018 Metzner Awardee will be selected by the Metzner Award Committee, currently chaired by Patrick Underhill (underhill@rpi.edu), and confirmed by the

SOR Executive Committee.

For details on rules and guidelines governing both award processes, see the SOR website.

Student Member Travel Grants for SOR Annual Meeting, Houston, October 2018

The SOR is pleased to offer student member travel grants for the 90th Annual Meeting to be held in Houston, Texas in October 2018. Students and advisors must be members of the Society in good standing as of 1 June 2018. Students cannot have received a prior travel grant, and the program is restricted to one grant per faculty advisor per meeting. This program is funded in part by generous donations by SOR members. The application process is available on the SOR website. For details, see the following website later in the summer: www.rheology.org/sor/annual_meeting/2018Oct/student.htm.

Gallery of Rheology, Houston 2018

The Gallery of Rheology held in Denver was a hit! So much so that a second version is planned for Houston in October 2018. Watch the SOR website for details.

Poster Contest Results from Denver

The poster session in Denver was extremely well attended. Many thanks to event sponsor Anton Paar. The Student/Post-Doc Poster Competition was conducted by session chairs Jim Gilchrist (Lehigh University) and Scott Roberts (Sandia National Laboratories). Honored in the Student category were:

1st place, [Rajarshi Sengupta](#), Lynn M. Walker, and Aditya S. Khair, "Linear viscoelasticity of a dilute emulsion of drops containing soluble surfactant;" 2nd place, [Michelle S. Mazzeo](#) and Kelly M. Schultz "Determination of macroscopic rheological properties of human mesenchymal stem cell laden poly(ethylene glycol) hydrogels;" and

3rd place [Ria D. Corder](#), Robert B. Vachieri, Darlene K. Taylor, Sashi R. Gadi, John M. Cullen, Friederike L. Jayes, and Saad A. Khan, "Quantifying enzymatic degradation of uterine fibroid tissue using rheology."

Two awards were made in the postdoc category, 1st place to [Nicolas Moreno](#) and Eliot Fried for the poster "Design of patchy nanoparticles via the self-assembly of triblock terpolymers in selective solvents," and 2nd place to [André De Almeida](#), Guilhem P. Baeza, and Dimitris Vlassopoulos, for "Linear and non-linear rheology of PBT/PTHF segmented copolymers."

Congratulations to all!

SOR Members have Full Online access to *Physics Today*

Membership has its benefits.

SOR is a member of the American Institute of Physics (AIP), a federation of physical-sciences societies and the publisher of *Physics Today*. SOR's membership entitles SOR members to a variety of benefits, including full online access to *Physics Today* and to the entire digital archive of *PT* (<http://physicstoday.scitation.org/department/all-departments>).

Founded in 1931 by five physics-related societies, including The Society of

Rheology, AIP was founded to further the "advancement and diffusion of knowledge of the science of physics and its application to human welfare" (www.aip.org).

**PHYSICS
TODAY**



Poster session honorees Ria Corder, Michelle Maseo, Rajarshi Sengupta, Andre De Almeida, and Nicholas Moreno.

The Gallery of Rheology was the brainchild of Anne Grillet (left) and Randy Ewoldt (second from left), pictured with the 2017 winners. Receiving first-place honors were Bavand Keshavarz and Michela Geri (3rd and 4th from left; not pictured is coauthor Gareth McKinley). The second place award went to the work of Anja Vananroye, Peter Van Puyvelde, and Christian Clasen (second from right). Also featured in the photo is Norbert Ponweiser, sales manager for the Rheology Division, representing event host Anton Paar.



The 2017 Publication Award was presented to Suzanne Fielding and David M. Hoyle. Fielding picked up the award on behalf of the team at the Awards Banquet in Denver. Pictured with Fielding are SOR President Gareth McKinley and JOR Editor Ralph Colby.

Shenanigans at the TA-sponsored Monday night reception in Denver's Colorado History Museum. Gareth McKinley and Jason Maxey do their best "Barrel Man" imitations (en. [wikipedia.org/wiki/Barrel_Man_\(Denver_Broncos\)](http://wikipedia.org/wiki/Barrel_Man_(Denver_Broncos))).



Minutes of ExCom Strategic Planning Retreat

Saturday, 10 June 2017

American Center for Physics, College Park, Maryland

Members present: Gareth McKinley, Norm Wagner, Albert Co, Chris White, Ralph Colby, Patrick Anderson (via WebEx), Maryam Sepehr (via WebEx), and Michael Solomon.

Members absent: Greg McKenna

President Gareth McKinley called the meeting to order at 10:00 am.

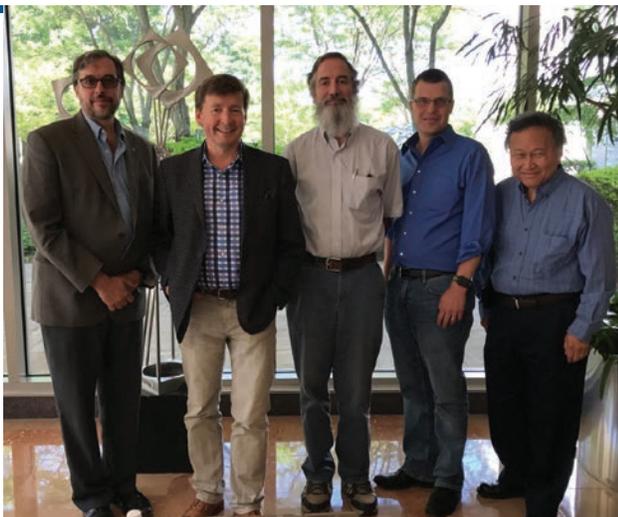
The attendees were divided into two groups. Each group was charged to perform a SWOT (Strengths, Weaknesses, Opportunities, and Threats) Analysis, write a draft of mission and vision statements for the Society, and then review, discuss, and revise the statements. The two groups then met together to discuss, revise and refine to arrive at the following set of statements:

Our Vision

An international community of rheologists working towards common goals as articulated in our founding Constitution.

Values

We are the nexus of excellence in the theory and practice of rheology. We are committed to advancement and promotion of the rheological sciences and practice of rheology broadly across diverse groups of individuals, disciplines and industries.



Members of the Executive Committee present in person at the June 2017 retreat: Norman Wagner, Gareth McKinley, Ralph Colby, Michael Solomon, and Albert Co.

Mission

We aim to expand the knowledge and practice of rheology through education, partnership and collaboration with associated fields, industries, and organizations, as well as to disseminate to diverse communities what rheology is, and how it impacts humanity and the world.

Several other items were discussed. These included the nominations of liaisons and representatives to AIP and AIPP, policy guidelines on proposed annual price raises to *JOR* Institutional Subscription Fees, multiyear membership options, and an SOR Fellow Student Mentoring Program proposed by Chris White.

The meeting was adjourned at 4:00 pm.

Submitted by
Albert Co, Secretary

Minutes of the ExCom Meeting

Sunday, 8 October 2017
Aspen Room, Embassy Suite – Denver Downtown Convention Center, Denver, Colorado.

Attending: Gareth McKinley, Norm Wagner, Albert Co, Chris White, Ralph Colby, Greg McKenna, Patrick Anderson, Maryam Sepehr, Eric Furst, Michel Cloitre, Faith Morrison, Andy Kraynik, Anne M. Grillet, Roseanna Zia, Kelly Schultz, Fred Kontur (AIPP), Liz Dart Caron (AIP) Gerry Fuller, Randy Ewoldt, Gordon Christopher, Matt Liberatore, Jason Maxey, Saad Khan,

Lilian Hsiao, Roger Bonneau, Peter Fischer (ESR), Jeffrey Giacomini, Peter Olmstead. Via WebEx: Michael Solomon.

President Gareth McKinley called the meeting to order at 7:59 am in Aspen Room, Embassy Suite – Denver Downtown Convention Center, Denver, Colorado.

The minutes of 12 February 2016 meeting were read by Secretary Albert Co. A motion to approve the minutes passed.

Ralph Colby gave the *JOR* editor report. The special issue on Associating Polymers has 18 papers, possibly 19. Evelyn van Ruymbeke did a great job as the guest editor. She has volunteered to do this again at the end of her new EU project DoDyNet.

Colby showed graphs displaying new manuscript submission statistics by months, years, countries and geographical regions. There were about 200 submissions in 2017. Submissions from China and Iran have increased; however, the number of papers accepted from these countries is not increasing. Overall about 100 papers were published per year.

Days from receipt to publication are up from 2016; this was due to an internal issue that had been resolved. All submitted manuscripts are sent to Cross-Check to determine overlap with previously published work. *JOR* has received high ratings (9.35/10) in post publication survey. The current *JOR* impact factor is 3.186.

Chris White presented the treasurer's report. White reported that the financial condition of the Society is good. An ad hoc Audit Committee has been appointed. The members are Monty Shaw (chair), Rekha Rao (Sandia) and Bamin Khomami (University of Tennessee, Knoxville). The committee will meet this week.

White showed graphs that depicted the trends of SOR expenses and revenues over the years. Graphs for *JOR* expenses and revenues were also shown. There was a \$40,000 increase in revenues due to bundling *JOR* with AIPP journals. Several items were discussed. White also showed the Charles Schwab accounting statement and explained some of the processes. The \$1 million at Charles Schwab is earning 1.2%.

Albert Co showed the daily cumulative votes of the most recent election; 40% of the members participated in the election. Co reviewed the website activities since the Tampa meeting. He also discussed features to be included in the new responsive member site, which would have a searchable *Rheology Bulletin* collection, with high quality versions, and unlisted YouTube videos of award lectures. Features of the to-be-updated SOR website were also discussed. The website would have a responsive design and expanded pages viewable in mobile

devices for Bingham medalists, Metzner awardees, and SOR Fellows. Morrison suggested hiring help to write up web bios for SOR Fellows. Co estimated that the website upgrades could be done by January 1st. McKinley offered that perhaps SOR could provide resources to help him meet the target.

Morrison brought up that photos taken at the meeting and events are being used in the *Bulletin* and online. We need a waiver as part of the meeting and event registration (or attendance) to be sure we have the right to take/use those photos. McKinley agreed.

Fred Kontur (AIPP) reported AIPP updates and presented proposal for growth potential. Several options were discussed. Option 1 is the current model for the *POF (Physics of Fluids)/POP (Physics of Plasmas)/JOR* package. The model assumes 23 new packages sales per year with no attrition. SOR has approved an 8% subscription price increase this year with 3% annual increases going forward. SOR is committed to this model for 2018. Option 2 is known as AIP Complete. It is a subscription package that includes all AIP Publishing and AIPP-published Member Society titles. The price to subscribers is discounted slightly to 80% of individual subscription prices. Option 3 is All Titles Upsell. It is a consortia-like offer for single site subscriber. It guarantees libraries to maintain their journal subscriptions for three years while allowing the subscriber to pay access fees (40% of list price) for non-subscribed titles. McKinley noted that ExCom must decide by Spring 2018 on whether to participate on this option for 2019-2020.

Kontur described the Cascade Initiative. Since February 2015, a cascade mechanism had been implemented to allow authors of rejected papers to have the opportunity to publish in the AIP gold open access journal, *AIP Advances*. This is currently implemented for *JOR*.



Kontur presented the concept of Publishing Partner. The current annual fee for service arrangement for *JOR* would be transformed into to a more collaborative Publishing Partnership model for multiple (five or ten) years. Topics like ownership and control over pricing were discussed. AIPP would like to prepare a proposal for consideration.

The change in the page format of *JOR* has reduced the printing costs and the mailing cost. Print costs per article have reduced by about 50%. The color printing fee is less affected by the page format change.

Kontur also described MC Lexicon, a thesaurus man-

agement system developed by Molecular Connections, and AIPP Scilight, which summarizes research articles and focuses on their significances and impacts on the relevant fields of science.

Roseanna Zia reported on updates and issues arising at the AIPP Publishing Partners Committee. Zia and Peter Olmstead participated at the committee meeting by teleconference. There was a great deal of discussion on open access. AIPP recommends utilizing social media.

John Regazzi was appointed as the chair of the Board of Directors of AIP. He also serves as the chair of Board of Managers of AIPP. Morrison reported that the search for the AIP CEO is ongoing, with interviews scheduled for November and December. Morrison is on the search committee. Appointment is slated by the end of the December interview period. Strategic planning is a current focus.

Eric Furst reported activities as SOR Member Representative to AIP. He reviewed the events that took place at the annual meeting and the workshops he attended.

Peter Fischer (European Society of Rheology) discussed the current state of ESR and the plans for ICR2023.

Matt Liberatore reported on the local arrangements of the Denver meeting. AV was a problem, but with time and effort the initial bid of \$49K was reduced to \$26K. Meeting the hotel room block could be an issue. The room block looked good at the closing of the deadline, but one company cancelled 30 rooms later. The short course had 19 registrants: 13 from industry, 4 from academia and 2 from government labs. There were 392 meeting registrants and 14 exhibitor registrations, the smallest for a fall meeting since 2009.

Randy Ewoldt and Anne Grillet reported on the technical program of the Denver meeting. There were 364 contributions: 261 oral presentations, 85 posters and 18 submissions for the Gallery of Rheology competition. The three largest sessions are Polymer Solutions and Melts (42), Suspensions, Colloids and Granular Systems (41), and Non-Newtonian Fluid Mechanics (40).

Andy Kraynik reviewed data of previous meetings.

Jason Maxey reported on the local arrangements of the Houston meeting in October 2018. Although the flooding of Hurricane Harvey in 2017 affected 30% of Houston, none of the SOR venues were affected. The meeting will be held in Westin Galleria. The meeting room layout were discussed. For the Monday evening event, the Saint Arnold Brewing Company is being considered; this will require bus transportation.

The proposed sessions and session chairs for the Houston meeting were presented by Gordon Christopher, a

co-chair of the Technical Program. Marie-Claude Heuzey is the other co-chair. The program was discussed and one suggestion is to encourage industrial participation.

Saad Khan reported on the local arrangements of the Raleigh meeting in October 2019. The hotel room rates and room block arrangement were discussed. An initial budget of the meeting was presented. The possibilities for Monday evening reception were discussed.

Roger Bonnacaze proposed to hold the 2021 Winter meeting in Austin, Texas. Two possibilities for the meeting hotels and options for Monday evening reception were discussed.

Liz Dart Caron (AIP) presented and went over the AIP-SOR Engagement Report. Also discussed were the *Physics Today* survey and the Diversity Initiative.

Faith Morrison reported on the *Rheology Bulletin*. Wagner congratulated Morrison on the recent good news related to the *Rheology Bulletin*: Marc-Antoine Fardin's paper "On the Rheology of Cats" (which appeared in the July 2014 issue of *Rheology Bulletin*) won the 2017 Ig Nobel Prize for Physics.

Kelly Schultz and Jason Maxey reported for the Membership Committee. The membership is slightly down. The committee is proposing a three-year membership. Vivek Sharma maintains a rheology presence on Facebook and Twitter.

Maryam Sepehr reported for the Education Committee. Sepehr will focus on short courses and Jonathan Rothstein on outreach activities. Possible topics for the short course in Houston were discussed. The K-12 Outreach Event was held today 1-4 pm at the Denver Children's Museum. Jonathan has a website listing ten outreach demos with instruction guides.

Gerry Fuller reported on international outreach. The International Committee on Rheology has admitted the Polish Society of Rheology. Colombia has active rheological groups. As ICR Secretary, Fuller will host a dinner at the AERC Sorrento meeting in April 2018 to discuss ICR2023 in Europe.

The open meeting was adjourned at 3:38 pm.

The Executive Session started at 3:54 pm.

A motion to endorse the Mission and Vision statements from the ExCom strategic retreat in June 2017 passed. The Mission and Vision statements will be posted on the web and request for comments. Minutes of the retreat will be provided.

A motion to endorse the Austin pre-proposal and proceed to a full proposal was passed unanimously.

Sponsorship of the AERC2018 in Sorrento was dis-

cussed.

A motion to increase the budget of the *JOR* Editorial Office was passed unanimously.

The cascading of articles to *AIP Advances* and the choice of *AIP Advances* Editor were discussed.

The Publishing Partners Proposal was discussed. A motion to request AIPP to prepare a full proposal passed.

The direction to AIPP beyond 2018 regarding AIP Complete Upsell will be decided in the May 2018 ExCom meeting. More information will be requested through a web-based meeting.

The "Rheology Nomenclature" will be voted electronically at a later date.

The appointment of a SOR representative to the AIP Public Policy Liaison Committee was discussed.

A motion to endorse the three-year membership proposal from the Membership Committee passed.

The exploration of sponsorship for the recordings of the Bingham and Metzner lectures was discussed. The consensus was not to proceed with the request for sponsorship.

A motion to fund and authorize meeting local arrangement chairs to include in their AV agreements the recording of Bingham and Metzner lectures passed.

The Executive Session was adjourned at 5:10 pm.

Submitted by
Albert Co, Secretary

Minutes of the Business Meeting

Tuesday, 10 October 2017
Denver, Colorado

President Gareth McKinley called the meeting to order at 12:03 p.m. in the Cripple Creek Ballroom of Embassy Suite Downtown Denver, Denver, Colorado (105 in attendance). The minutes of the previous Business Meeting in Tampa, Florida were slowly scrolled on the screen by Albert Co. McKinley asked for questions. A motion to accept the minutes passed.

McKinley noted that Wes Burghardt served as Chair of the 2017 Nominating Committee and he was thanked. Incoming officers are Michael Graham, vice president, and three new members at large: Michel Cloitre, Eric Furst, and Amy Shen.

Ralph Colby gave the *JOR* Editor's report. The special issue on Associating Polymers has 18 papers, possibly

19. Evelyne van Ruymbeke did a great job as the guest editor. Colby showed graphs displaying new manuscript submission statistics by months, years, countries and geographical regions. New manuscript submissions are healthy. He has been working hard with AIPP to make the submission process and the peer review process faster and easier. Cross-Check was used to check for duplication in the literature. Days from receipt to publication are up from 2016, but it has returned to the target of six months. *JOR* has received high ratings (9.35/10) in post publication survey. Colby commented that Roseanna Zia is doing a great job as associate editor. The pages published per year went through a change due to a change in page format. The current *JOR* impact factor is 3.186. A motion made to accept the report was seconded and passed.

Chris White presented the Treasurer's report. White reported that SOR is in good financial shape. SOR has transferred \$1,000,000 from AIP to Charles Schwab, where it is FDIC insured. White showed graphs that depicted the trends of SOR expenses and revenues over the years. Graphs for *JOR* expenses and revenues were also shown. Several issues were discussed. There is a new Audit Committee and the Financial Committee will continue its work. A motion to accept the report was seconded and passed.

Co-chair Kelly Schultz gave the report for the Membership Committee. Schultz presented graphs showing trends in membership, with a slow downward trend in the industry category. The committee is seeking to recruit a new committee member from industry. They are recommending a three-year membership. The causes for losing members were discussed. A motion to accept the report was seconded and passed.

Jonathan Rothstein reported on outreach activities for the Education Committee. An outreach event was held Sunday at the Denver Children's Museum. About 250 kids and their parents came to the outreach event. There were ten demos. The collaboration with the Children's Museum went well. The Children's Museum advertised the event on social media; there were announcements throughout the day directing kids to the event. Joe Samaniuk helped coordinate locally for materials. Ten demonstration kits have been developed in collaboration with the AIP Venture Partnership Fund. Anyone interested can get information from the outreach website (link on SOR homepage). Instructional materials include

middle-school-level discussions and a higher-level discussions for teachers. Movies to go with the demonstration kits are being developed and will be available on YouTube. SOR is paying to ship the kits within the US.

Maryam Sepehr reported on the short course "Extensional Rheology" by Nicholas Alvarez, Cari Dutcher, and Martin Sentmanat. The short course was attended by 19 people, mostly from industry. Sepehr put up some ideas they had received for short courses at the Houston 2018 meeting. Members who have suggestions for future short courses should contact the committee.

McKinley reported on the SOR Strategic Planning Retreat on 10 June 2017. The Executive Committee met at the American Center for Physics to discuss long term issues. Before the retreat SOR had an "objective" but did not have a mission/vision. McKinley presented the new mission statement approved by the Executive Committee. The mission statement consists of three headings: "Our Vision," "Values," and "Mission."

Secretary and Webmaster Albert Co reported that the members' website has been down, but new changes and design for the web app are being developed. The web app is expected to go live in November 2017.

Several initiatives are planned for the annual meetings. First, the Bingham Lectures (and possibly the Metzner Award Lectures) will be recorded. The videos will be hosted as unlisted on YouTube. Second, steps to facilitate greater industrial participation will be implemented. Next year session chairs are empowered to have an industrial keynote lecture in their session. The industrial keynote lectures will be the same length as other talks but will be scheduled to avoid conflict with other keynote lectures. The presenters will receive letters of invitation to facilitate their attendance.

Several comments were brought up by the audience. These included the future of "rheology," changing the Society's name to be more encompassing and include relevant fields, making sessions more accessible to industrial participants, and reaching out to different industries who use rheology for different purposes.

The meeting was adjourned at 1:25 p.m.

Submitted by
Albert Co, Secretary

Secretary's Report

Visit the SOR History Portal at AIP!

history.aip.org/society-portals/sor/sor.html

Treasurers Report.

The Society of Rheology (SOR) is in a solid financial position right now. SOR has significant financial reserves, a strong brand, and a dedicated following.

The accompanying charts document expenditures and revenues for the past years, including the 2018 budget proposal voted on in Denver at the October meeting. Preliminary examination shows for 2017 expenditures were in line with expectations. The two meetings each ran small surpluses. It is projected that 2017 showed a small surplus, which is a significant improvement over an earlier projection.



The other known revenue and expenses are in line with the approved 2017 budget. The detailed accounting for 2017 will be provided once the year-end numbers are available. A full report will be available to any member on request, and a detailed report will be presented to the Executive Committee during the May meeting.

At the request of the Executive Committee the Finance Committee has moved \$1M of the SOR reserve from the AIP to an account at Schwab. The \$1M in funds will be invested in fully insured bonds based on discussions with the Finance Committee and approved by the Executive Committee at the Tampa meeting. Currently, this account is generating slightly more than ~1%/annum in interest income in 2017. This is currently an additional \$5K in interest income.

Additionally, 2017 saw the creation of an Audit Committee. The Audit Committee (Monty Shaw, Rekha Rao, and Bamin Khomami) met in Denver and is working diligently to examine the SOR accounts. They will report on the progress to both the Executive Committee and the membership in Houston.

The five-year balance sheet, Society of Rheology, and *Journal of Rheology* reports are provided below. These

are not changed from the detailed report distributed at Denver meeting. However, note that the expense subcategories reported to the Society from AIP have been modified and adapted to enable clearer monitoring of costs associated with print copies, online delivery, web hosting etc. Note that the 2018 projection is for a nearly balanced budget (with a small, net positive), in keeping with our non-for-profit status and mission.

Longer term analysis

While global challenges facing publishers and publishing review continue to be of concern, recent actions by The Society of Rheology have mitigated, or even improved our financial situation. The institutional subscriptions have not decreased as fast as projected while the new consortium sales have increased. The dues increase has increased the SOR revenue by ~\$20K. Yet the SOR is still dependent on the surplus revenue from the *JOR* to support annual operating expenses. The expenses have grown to be significantly greater than the revenue from the SOR. Again, the last several years have shown challenges to the net revenue for the combination of SOR and *JOR*. Note that the *JOR* also has revenue streams from licensing royalties (\$21K) and advertising (\$33K) in addition to subscription revenue. Going forward there is considerable uncertainty in the out-year revenue projections for *JOR*. Open access, bundling, decreases in library subscriptions, increasing costs of collection may challenge the net revenue of *JOR* in future years. Even a small change in projected revenue of the *JOR* may severely impact the overall balance sheet of SOR. SOR has taken some steps to accommodate these risks, such as the formation of a Finance Committee. These efforts will be overrun by even a slight negative change in the revenue model for *JOR*. It will be important for SOR to consider a possible future without the consistent and significant revenue from the *JOR*. This would require significant changes in both the revenue and expense sides of the ledger. The SOR has sufficient reserves to manage for up to three years even after a complete collapse in the *JOR* revenue so the situation requires careful observation but not extreme action.

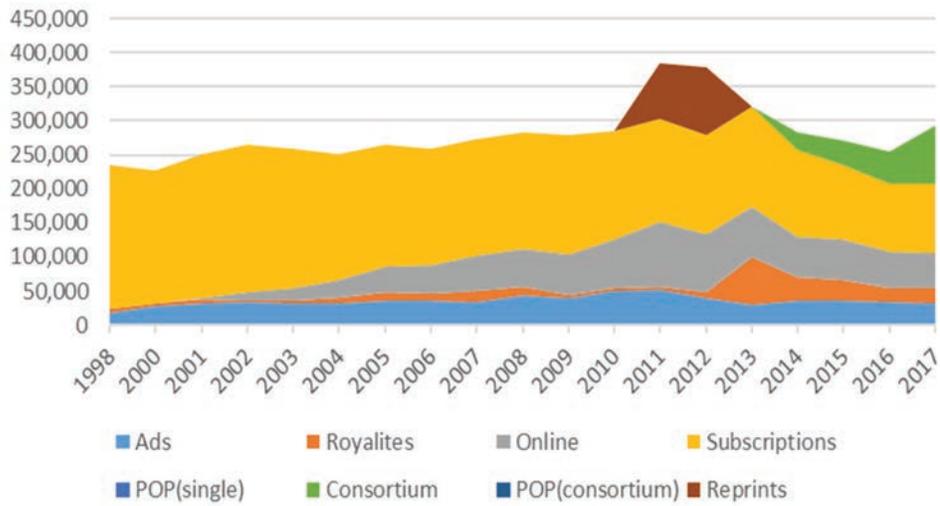
Sincerely, Christopher White, Treasurer



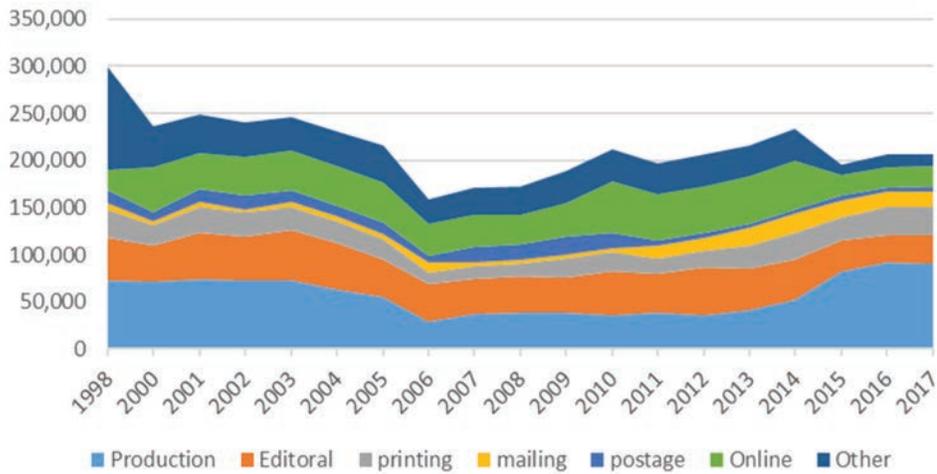
The Society of Rheology was founded in 1929 to foster the study of the mechanical properties of deformable materials. SOR is a founding member of the American Institute of Physics.

Visit our web site www.rheology.org/sor/

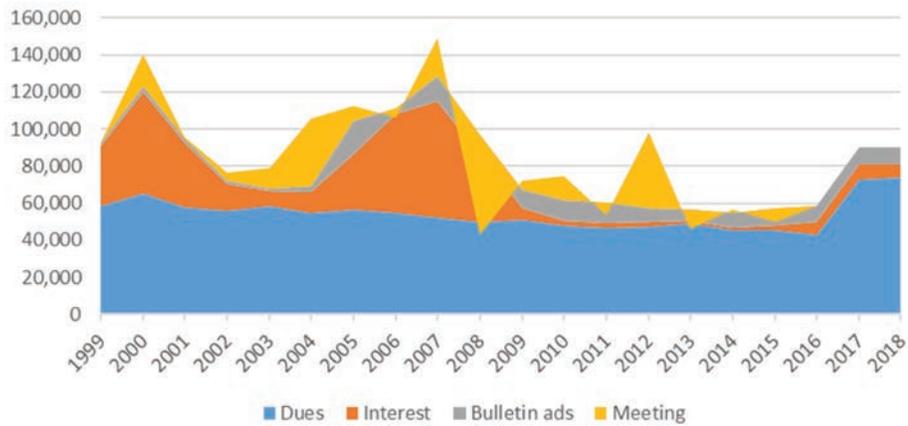
JOR Revenue



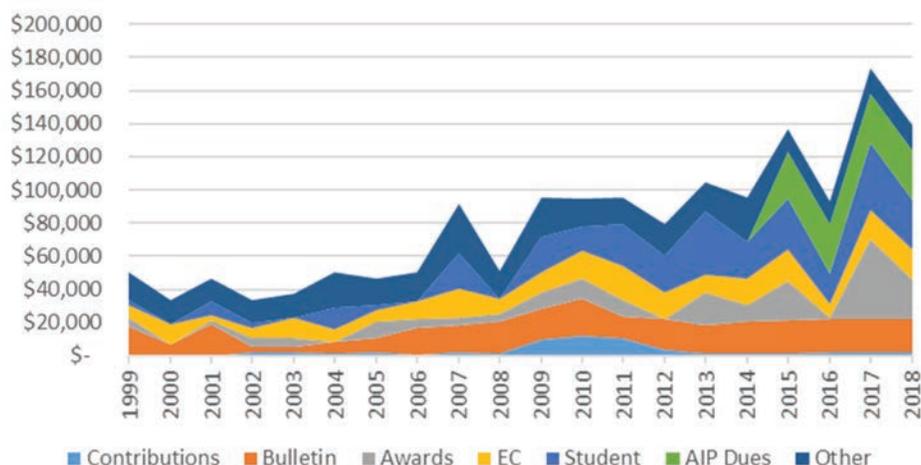
JOR expenses



Revenue for SOR



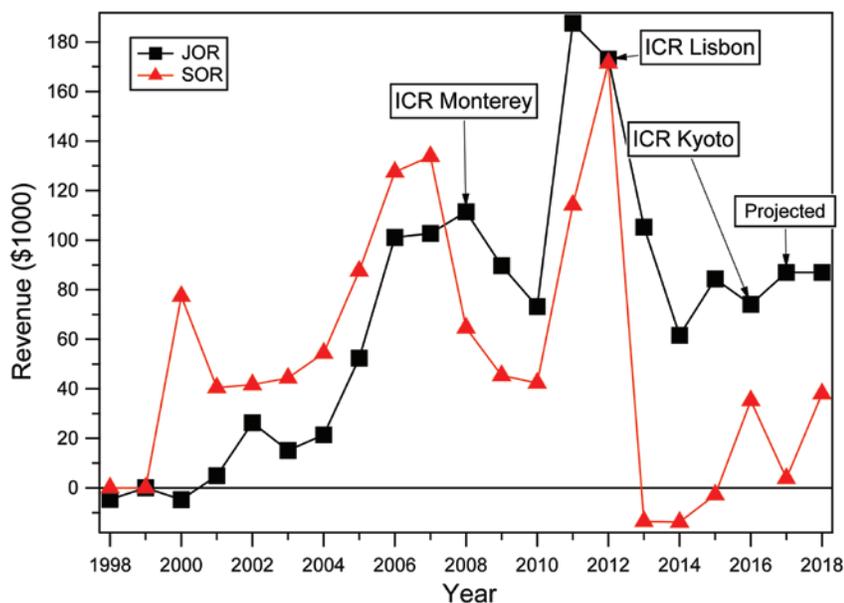
Expenses for SOR



The Society of Rheology, Inc. Balance Sheet

(all amounts, USD)	2017	2016	2015	2014	2013	2012
Assets						
Cash in checking account(s)	\$ 134,527.00	\$ 45,027	25,181	69,163	147,077	73,886
Balance in AIP account	\$ 701,940	\$ 1,807,110	1,731,373	1,665,049	1,595,079	1,685,279
Schwab	\$ 1,002,136					
Accounts Receivable		\$ 5,000				
Prepaid Expense		\$ 10,269				
Total Assets	\$ 1,838,603	\$ 1,867,406	1,756,554	1,734,212	1,742,155	1,759,165
Liabilities and Net Assets						
Liabilities						
Deferred revenue	\$ 127,270	\$ 193,550	132,440	104,337	100,652	114,980
Total Liabilities	\$ 127,270	\$ 193,550	132,440	104,337	100,652	114,980
Net Assets						
Publication reserve	\$ 450,000	\$ 450,000	450,000	450,000	450,000	450,000
Student travel grant reserve	\$ 30,000	\$ 30,000	30,000	30,000	30,000	30,000
Annual Meeting reserve	\$ 300,000	\$ 300,000	300,000	300,000	300,000	300,000
Operating reserve	\$ 150,000	\$ 150,000	150,000	150,000	150,000	150,000
Unrestricted	\$ 743,857	\$ 708,656	826,554	699,875	711,503	714,185
Net Revenue	\$ 35,200	\$ 35,200				
Total Net Assets	\$ 1,709,057	\$ 1,673,856	1,624,114	1,629,875	1,641,503	1,644,185
Total liabilities and net assets	\$ 1,836,327	\$ 1,867,406	\$ 1,756,554	1,734,212	1,742,155	1,759,165

Treasurer's Report



The Society of Rheology Receipts and Disbursements								
	2018 Budget	2017 Estimate	2017 Budget	2016 Year end	2015 Year end	2014 Year End	2013 Year End	2012 Year End
RECEIPTS								
Dues	73,060.00	73,600.00	73,060	42,892	44,980	45,590	49,305	49,305
Interest	10,000.00	8,000.00	2,000	6,812	2,092	942	1,174	1,174
Journal of Rheology	290,000.00	290,000.00	275,000	270,858	284,180	297,016	325,649	325,649
Donations	1,000.00	1,000.00	1,000	-	0	0	0	0
Bulletin Advertising	9,000.00	9,000.00	9,000	9,113	9,505	8,092	6,340	6,340
Annual Meeting (net)			-	-	-14,589	2,181	-10,789	253,222
Short Course (net)			-	-	2,195	10,385	-6,376	12,210
TOTAL RECEIPTS	383,060	381,600	360,060	329,675	328,363	364,207	365,303	647,899
DISBURSEMENTS								
AIP Dues Bill & Collect.	30,000.00	30,000.00	30,000	25,942	27,876	10,287	11,033	11,033
AIP Adm. Services			-	-	0	1,106	7,500	7,500
AIP Mem. Soc. Dues			-	-	0	14,089	13,886	13,886
Contributions and Prizes	1,650.00	1,650.00	1,650	2,150	1,650	1,650	1,500	1,500
Early Career Award	8,000.00	15,250.00	15,250	1,452	7,625	7,620	15,100	0
Journal of Rheology	200,000.00	200,000.00	200,000	200,372	196,266	247,550	226,765	226,765
Bulletin	19,000.00	19,000.00	19,000	19,770	19,664	18,590	16,836	16,836
Bingham Award	16,000.00	32,000.00	32,000	-	16,126	10,827	20,000	20,000
Executive Cmt. Meetings	20,000.00	20,000.00	20,000	9,028	18,713	17,484	10,710	7,890
Pres. Discretionary Fund	1,500.00	1,500.00	1,500	897	0	1,824	919	919
Treas. Discr. Fund	1,500.00	1,500.00	1,500	281	197	288	0	0
Bulletin Editor Discr. Fund	1,500.00	1,500.00	1,500	-	0	517	0	0
Progr. Chm. Discr. Fund	3,000.00	3,000.00	3,000	-	0	-1,554	1,395	1,395
Webmaster Discr. Fund	3,000.00	3,000.00	3,000	3,147	0	1,447	3,000	3,000
International Activities Fund	5,000.00	5,000.00	5,000	4,469	0	0	1,313	0
Office Expenses	1,700.00	1,700.00	1,700	-	-	11,487	1,614	1,614
Banking Services			-	-	-	0	0	0
Liability Insurance	6,500.00	6,300.00	6,300	5,921	6,300	5,406	5,413	5,413
Membership Broch. & Appl.			-	-	0	0	62	62
Accountant	3,000.00	3,000.00	3,000	2,900	2,660	2,400	2,210	2,210
Student member travel	25,000.00	30,000.00	50,000	15,097	31,000	22,497	37,675	0
Annual meetings, future	3,000.00	3,000.00	3,000	3,049	0	2,925	1,076	1,076
Website	1,500.00	1,500.00	1,500	-	3,074	1,602	819	819
Miscellaneous	100.00	100.00	100	-	0	0	0	0
TOTAL DISBURSEMENTS	350,950.00	379,000	399,000	294,475	331,151	378,041	378,825	321,918
Net	\$32,110	\$2,600	-\$38,940	35,200	-2,788	-13,834	-13,522	325,981

Journal of Rheology
Receipts and Disbursements

	2017 Projected	2016	2015	2014	2013	2012	2011
REVENUES (AIP report)							
Advertising Sales	33,000	\$ 33,603	\$ 32,141	\$ 35,886	\$ 30,800	\$ 39,602	\$ 51,856
Royalties	22,000	\$ 21,340	\$ 28,369	\$ 33,197	\$ 69,736	\$ 108,919	\$ 88,162
Single-Copy Sales		\$ 3,342	\$ -	\$ -	\$ 105	\$ -	\$ -
Consortium Access Fees	53,169	\$ 52,081	\$ 60,007				
Consortium Subscription	86,663	\$ 45,734	\$ 35,766				
JOROL Income		\$ -	\$ -	\$ 150,364	\$ 72,872	\$ 84,695	\$ 94,242
Subscriptions	100,340	\$ 99,385	\$ 110,170	\$ 75,569	\$ 148,137	\$ 145,850	\$ 150,980
Total Revenue	\$ 295,172	\$ 255,485	\$ 266,453	\$ 295,016	\$ 321,649	\$ 379,066	\$ 385,240

EXPENSES (AIP report)							
Adv. Prod. and Hand.				\$ 8,433	\$ 8,233	\$ 10,305	\$ 13,033
Production				\$ 53,010	\$ 42,120	\$ 35,955	\$ 38,250
Cash Discounts & Rebates				\$ 917	\$ 2,030	\$ 1,972	\$ 1,313
Editorial Management	\$ 30,000	\$ 30,381	\$ 32,963	\$ 41,124	\$ 42,550	\$ 50,272	\$ 40,914
Reprint Printing and Mailing				\$ 91	\$ -	\$ 221	\$ 630
Back copy expense				\$ 434	\$ 30	\$ 145	\$ -
Subscription Ful'ment, Member	\$ 7,000	\$ 5,845	\$ 7,239	\$ 4,263	\$ 3,284	\$ 3,377	\$ 3,491
Subscription Ful'ment, Nonmem.				\$ 2,112	\$ 1,818	\$ 1,811	\$ 1,848
Subscription Ful'ment, Comp/Ex	\$ 4,000	\$ 4,256	\$ 4,399	\$ -	\$ 15	\$ 14	\$ 11
Marketing Expense(consortium)	\$ 12,000			\$ 1,965	\$ 2,900	\$ 1,209	\$ 652
Storage	\$ 1,400	\$ 1,360	\$ 1,298	\$ 1,252	\$ 962	\$ 1,011	\$ 781
Vendor Management Fee	\$ 7,000	\$ 6,939	\$ 7,986	\$ 272	\$ 1,470	\$ 1,213	\$ 2,972
One-time setups				\$ -	\$ 900		
Credit Card and Bank Fees				\$ 494	\$ 460	\$ 473	\$ 393
Agency rebate/service fee	\$ 1,200	\$ 1,210	\$ 1,651				
Direct Marketing			\$ 23				
Back number expense	\$ 300	\$ 218	\$ 386				
Open Access Article Fees	\$ 500	\$ 425	\$ 213				
Open Access Permission Fee			\$ 15				
Shipping			\$ 782				
Admin Services	\$ 7,875	\$ 7,875	\$ 7,875				
Single-Copy Sales	\$ 500	\$ 300	\$ 483				
Standard Page Charges	\$ 35,000	\$ 33,143	\$ 23,603				
PXP MANUSCRIPT	\$ 5,000	\$ 4,160	\$ 5,408				
PXP Platform Fee	\$ 2,700	\$ 2,700	\$ 2,700				
OP adv Journal Fee	\$ 1,000	\$ 9,728	\$ 9,618				
JOR MERCHANT account fee	\$ 3,000	\$ 2,732	\$ 2,561				
JOR CC fees	\$ 1,000	\$ 678	\$ 1,273				
JOR Other (best paper, CHORUS, et	\$ 1,000	\$ 550	\$ 1,503				
Fixed Expenses Total	\$ 120,475	\$ 112,500	\$ 111,979	\$ 114,367	\$ 106,771	\$ 107,978	\$ 104,288

Print Expenses							
Printing and Binding	\$ 25,000	\$ 24,608	\$ 30,222	\$ 29,425	\$ 25,123	\$ 17,839	\$ 17,398
Paper	\$ 12,000	\$ 11,543	\$ 12,732	\$ 12,968	\$ 10,735	\$ 9,501	\$ 8,869
Mailing Expense	\$ 5,000	\$ 4,356	\$ 3,347	\$ 19,857	\$ 18,598	\$ 14,465	\$ 12,493
SHIPPING international	\$ 13,000	\$ 13,493	\$ 12,918				
Postage	\$ 6,000	\$ 5,134	\$ 4,385	\$ 5,081	\$ 5,066	\$ 5,154	\$ 6,751
Subscription Ful'ment, Nonmem.	\$ 3,000	\$ 2,987	\$ 2,362				
Print total	\$ 64,000	\$ 62,121	\$ 65,966	\$ 67,330	\$ 59,522	\$ 46,959	\$ 45,512

Online Expenses				\$ 51,785	\$ 49,609	\$ 49,239	\$ 47,830
JOROL Expense							
Cross Ref Fee	\$ 400	\$ 316	\$ 53				
OL hosting fee	\$ 21,850	\$ 21,850	\$ 21,850				
Online Total	\$ 22,250	\$ 22,166	\$ 21,903	\$ 51,785	\$ 49,609	\$ 49,239	\$ 47,830
Total Expenses	\$ 206,725	\$ 196,787	\$ 199,848	\$ 233,483	\$ 216,337	\$ 205,998	\$ 197,630
NET	88,447	58,698	66,605	61,534	105,312	173,068	187,609

Treasurer's Report end



Bingham medalists in attendance in Denver included: (rear) John Brady, Hiroshi Watanabe, Greg McKenna, Norman Wagner, Eric Shaqfeh, Ron Larson, (front) Mort Denn, Gerry Fuller; 2017 medalist Julia Kornfield, Gary Leal, Henning Winter, Ralph Colby, and Gareth McKinley.



The Denver meeting attracted a full slate of SOR Fellows: (rear) Antony Beris, Ole Hassager, Jan Vermant, Susan Muller; John Brady, Hiroshi Watanabe, Eric Shaqfeh, Ronald Larson, Hans Martin Laun, Lynn Walker, Jay Schieber, Wesley Burghardt. Front: Don Baird, Morton Denn, Faith Morrison, Gerry Fuller, Gary Leal, Henning Winter, Pierre Carreau, and Manfred Wagner.

(Calendar, continued from page 32)

2021

February 2021

92nd Annual Meeting of The Society of Rheology, Austin, TX, USA, Roger Bonnecaze.

October 2021

93rd Annual Meeting of The Society of Rheology, Bangor, Maine, USA, Albert Co.

2022

October 2022

94th Annual Meeting of The Society of Rheology, location, TBA.

For other meeting notices, see also: www.rheology.org/sor/info/Other_Meetings.htm; www.appliedrheology.org



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CALENDAR OF RHEOLOGY CONFERENCES AND COURSES

2018

17-20 April 2018

Annual European Rheology Conference, AERC2018, Sorrento, Naples, Italy, Mario Minale, Stefano Guido, and Giovanni Ianniruberto. (rheology-esr.org/aerc2018/)

16-17 April 2018

AERC Short Course: Particles, Active Matter, Confinement and Viscoelasticity: The Microfluidic Playground, Sorrento, Naples, Italy, Pier Luca Maffettone.

10-14 June 2018

The 7th Pacific Rim Conference on Rheology (PRCR 2018), Jeju, South Korea, Do Hyun Kim (www.prcr2018.org).

13-14 October 2018

SOR Short Course on Rheology (topic TBA), Houston, Texas, USA.

14-18 October 2018

90th Annual Meeting of The Society of Rheology, Houston, Texas, USA, Jason Maxey.

2019

8-11 April 2019

Annual European Rheology Conference, AERC2019. Portoroz, Slovenia. (rheology-esr.org/aercs)

19-20 October 2019

SOR Short Course on Rheology (topic TBA), Raleigh, North Carolina USA.

20-24 October 2019

91st Annual Meeting of The Society of Rheology, Raleigh, North Carolina, USA, Saad Khan.

2020

2-7 August 2020

XVIIIth International Congress on Rheology, Rio de Janeiro, Brazil, Paulo de Souza Mendes and Roney Thompson (icr2020.com); in Europe in 2023.

(continues, page 31)